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## SECTION IV DISCUSSION

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### 4. A CONTEXT FOR INTERPRETATION

#### 4.1 Scope of Participant Demographics

Before discussing the key priorities that emerged from the Workshop, it is important to review the context within which the Workshop took place, and in particular the background of participants. The majority of workshop participants were not funded by NIH to participate in the workshop, but rather were supported by their home institution or personal resources. This suggests that most participants had a *vested* interest in the outcome of the Workshop (i.e., were stakeholders, desiring to be part of the process). The analysis of participant titles and affiliations indicated that many of these individuals held leadership positions and also provided broad representation for many of the professional categories currently involved in using or developing gait analysis techniques. Therefore, it may be concluded that the set of prioritized recommendations is likely a comprehensive summary of expert opinions.

#### 4.2 The Recommendations

The first Workshop goal was to develop a comprehensive set of recommendations related to the future use of gait analysis as a tool to enhance the lives of people having impairments and functional limitations of the locomotor system that cause disabilities. A Workshop format with three breakout groups was implemented. Each of the three groups was instructed to develop recommendations under one of the three focus topics: A) The use of gait analysis as a patient assessment tool; B) The use of gait analysis assessments in treatment planning and/or treatment implementation; and C) Factors which prevent the people with locomotion disabilities from accessing gait analysis. Contact between groups was extremely limited during the recommendation development sessions due to the dispersed proximity of the workrooms and the rigorous work schedule. In addition, the workshop coordinators placed no limitations on the number of recommendations that a group could develop and the duplication of effort between groups by the workshop coordinators.

Remarkably, the three groups generated nearly equal portions (A=12, B=12, and C=13) of the total number of recommendations. Each of the 5 recommendation classes contained at least one recommendation from each working group and each of the three highest prioritized recommendations within each class, except class 1 recommendations, came from different groups. This is remarkable considering the working groups independently developed recommendation categories and were asked to focus their efforts on different topics. While striking similarities were found between paired recommendations from different groups, the diversity of topics and issues represented by the entire set of recommendations is a considerable accomplishment.

### **4.3 Interpretation of Priority Scoring**

The second Workshop goal pertained to the prioritization of the recommendations. In short, participants were asked to indicate, by numerical score, the relative level of importance (priority) of each recommendation. The Executive Committee speculates that participants utilized a combination of at least two factors to establish priority scores: The first and most obvious factor relates to the relative importance of a recommendation with respect to other recommendations. The second factor related to any perceived need to execute a series of recommendations in a sequential fashion. It can be argued that many of the recommendations are linked to a time continuum by one or more factors. For example, participants may have felt the need to establish a complete understanding of the benefits derived from gait analysis before one should begin teaching the art and science of the field. In this example, the educational component may have value equal to the issue related to understanding of benefits even though it received a lower priority score. In light of such factors, great care should be taken not to interpret high priority scores (recommendations of low priority) as being indicative of "bad" recommendations or recommendations having little value. The recommendations of higher priority (low priority scores) may simply need to be addressed first.

Several aspects of the Workshop were designed to develop a strong relationship between the priority scores and the final written recommendations. The Workshop was designed to allow little time for group discussions on the relative priority of recommendations. For example, participant knowledge of their assignment to one of the three working groups was minimized prior to the Workshop. The brunt of the recommendation development activities occurred in small groups under tight time constraints. The recommendation presentation and discussion sessions were designed to assist participants in reviewing the written recommendations. An attempt was made to minimize the definition or clarification of key recommendation concepts that extended well beyond recommendation text. One or two participants did take the opportunity to express strong opinions as to the importance of specific recommendations and their personal interpretations of recommendation statements during these sessions. However, these incidents were few in number and resulted in minimal discussion. Therefore, we believed that participant scoring patterns reflect their interpretations of the documented recommendations and that these opinions were influenced minimally by individual statements (lobbying efforts) and clarifications of recommendation text that have gone undocumented. This is an extremely important concept since the linking of the recommendations and priority scores is crucial to their present and future interpretation.

### **4.4 Overview of Future Opportunities**

Another Workshop goal was to document the similarities and differences in participant opinions towards the set of recommendations in such a way that future opportunities could be readily realized. The most obvious opportunity area relates to the individual recommendations that consistently received high priority or low priority scores. A review of mean priority scores and scoring distributions indicates that several of the recommendations can be classified in this manner. In brief, high priority items require action plans (several of which are contained latter in this section) and the implementation of action plans related to recommendations of low priority should be considered only after considerable reflection. The distribution of some recommendation scoring patterns was flat or binomial in nature. These recommendations are indicative of excellent opportunities for further discussion and clarification on topics and action

items over which there exists significant divisions in thought within the community of gait analysis professionals. For example, recommendation A12 (Scope of gait analysis) recommended a broadening of the scope of gait analysis to movement analysis. This recommendation was ranked 19 out of 37, i.e., there were 18 recommendations ranked higher and 18 lower. Yet it had 17 participants (26%) rank it as a very high priority and 32 participants (49%) score it under 250; yet 13 (20%) participants gave it a score over 500. Under such conditions, constructive dialogue between individuals with opposing opinions is clearly the vehicle of choice when resolution of these differences is desired.

Therefore, we propose the following action items.

#### **4.4.1 Action Item #1:**

The professional organizations and societies, of which Workshop participants are members, should consider developing opportunities (i.e., round table discussions, open debates, and advisory boards meetings) for the clarification and documentation of differences in opinion that exist between experts on pertinent recommendation topics.

### **4.5 Efficacy, Outcomes and Cost Effectiveness Research**

The highest priority was assigned to research on the efficacy, outcomes and cost effectiveness of gait analysis. Perhaps a key reason was the “help us” concept: in an increasingly challenging health care environment, the need for research that objectively documents efficacy grows. In particular, the suggested key areas requiring research activity relate to the effects of gait analysis on treatment decisions and functional outcomes. The top recommendation states that:

“Research must accomplish the following:

1. Compare and contrast the effectiveness of clinical practice in the presence or absence of gait analysis.
2. Identify which patient categories objectively benefit from clinical gait analysis.
3. Replicate the findings of efficacy, outcomes and cost effectiveness studies to determine whether the results from particular studies are consistent and generalizable.”

In reviewing the recommended actions for the 6 recommendations in Class 3 that were in the top eight of all recommendations, 5 of the 6 suggest increasing support for research in fairly general terms. While one (C4), specifically recommends that funding be provided to Centers of Excellence to design well-controlled studies.

When assimilated, the following action item emerges.

#### **4.5.1 Action Item #2:**

Funding agencies should consider supporting research that addresses the general objectives of these 6 recommendations. Since the recommendations are not specific with regards to areas of impairment or pathology, target populations should be left fairly broad. Relatively high priority

should be given to proposals addressing treatment decision making and functional outcomes. The members of study sections, who are charged with the evaluation of these proposals, should be encouraged to review the contents of this report prior to performing their reviews.

#### **4.6 The Causal Link Between Structure and Function**

The fourth and seventh highest scored recommendations were the only two recommendations within the Top 8 that were not from Class 3. Both A11 “Development of models to study the relationship between the observed abnormal gait, lower extremity structure, and underlying etiology” and B9 “Identify the relationship between impairments, functional gait limitations, and disability” emphasized a need to better understand the effect of physical impairments such as lower extremity malalignment or muscular weakness on the resulting deficits and compensations in lower extremity function during gait. Both recommendations contain suggestions that these objectives could be met in part with improved neuromusculoskeletal models of the locomotor system. They suggest a model-based theoretical framework that provides both measurement and predictive capabilities is key to understanding the “relationship” between lower extremity structure and function. Both recommendations also suggest that the development, validation, and implementation of these models requires an intimate link between the measurement of impairments and functional limitations in gait.

##### **4.6.1 Action Item #3:**

Funding agencies should strongly consider sponsoring research aimed at establishing the causal link between lower extremity structure and function during gait. This research should include development and refinement of neuromusculoskeletal models of the locomotor system and its components that are capable of explaining the causal relationship between lower extremity impairments and function during gait. This research should include gait analysis and other direct measures of impairments and gait function and be applicable to diverse patient populations.

#### **4.7 Education/Training**

Despite the fact that none of the education-based proposals (Class 5) were in the Top 8 and that the recommendation for consumer and patient education (C11) received a lower priority rating, Class 2 (Education) ranked second only to Class 3 as an overall priority. Additionally, quite a few of the Top 18 proposals included an education aspect, even if not the primary thrust. The bottom line is that there was a strong sense of need for better training of health professionals in quantitative gait assessment, particularly young clinicians. The recommended actions include multiple mechanisms for making this happen, including a direct recommendation that NCMRR in particular provide a funding mechanism for the development of educational teaching tools, and for a fellowship program explicitly in gait analysis.

##### **4.7.1 Action Item #4:**

Funding agencies should consider creating an explicit, coordinated mechanism aimed at the development, dissemination and evaluation of customized educational courses and materials related to gait analysis. Funding mechanisms should include not only initial development costs but also costs for evaluating, refining, and disseminating these materials.

## **4.8 Standardization**

Each of the Work Groups generated one or more recommendations focusing on standardization issues. While it is quite clear that there exists a strong desire for standardization amongst the participants, there appears to be “multiple opportunities for standardization” (B5) and numerous suggested techniques for their development and implementation (see recommendations B5, C6, A12, A6, and C8).

Therefore, we feel the following action item is warranted:

### **4.8.1 Action Item #5**

Funding agencies should create mechanisms for supporting standardization activities when these activities relate to agency goals. For example, the National Center for Medical Rehabilitation Research should consider supporting the standardization activities of professional organizations. This should occur when the lack of standardization in a given area is considered a barrier to the development of scientific knowledge needed to enhance the health, productivity, independence, and quality of life of persons with disabilities.